User's Manual

for the

Cranex Excel D

and

Cranex BaseX D

Digital version

CE
0537

Medical Device Directive
93/42/EEC

05-2004

User's Manual for the
Cranex Excel D and Cranex BaseX D

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1. The Excel D and BaseX D x-ray units

Introduction

This manual describes how operate the **Cranex Excel D** and **Cranex BaseX D** dental x-ray units.

The **Excel D** is a panoramic dental unit that can take full and reduced width panoramic exposures, sinus exposures, partial panoramic exposures and TMJ exposures.
The **BaseX D** is a simplified version of the Excel. It can take full and reduced width exposures and sinus exposures. In addition, height adjustment is manual and not motor driven as it is with the Excel.
All versions use a CCD sensor as the image receptor.

Please read these instructions carefully before using the x-ray unit.

Using this manual

All key illustrations indicate that the key must be pressed.

A white circle indicates that the indicator light is on. When the light is on it indicates that the value or setting is on or has been selected

● 65

A black circle indicates that the light is off and the value or setting is off or has not been selected.

Warnings and precautions

- These dental x-ray units must only be used to take dental x-ray exposures. These dental x-ray units must not be used to take any other x-ray exposures.
- The x-ray unit or its accessories must not be modified, altered or remanufactured in any way.
- The x-ray unit may be dangerous to both patient and operator unless safe exposure values are used and correct operating procedures are observed.
- As radiation safety and protection requirements vary from country to country and state to state it is the responsibility of the operator to ensure that all local and national radiation safety and protection requirements are met.
- When taking exposures operators must protect themselves from radiation.
- When taking exposures operators must stand at least two metres (six feet) from the patient.
- Operators must be able to see and hear the patient during an exposure.
- Operators must be able to see the exposure warning lights and hear the exposure warning signal during exposures. If the x-ray unit is located in such a position that the operator cannot see the exposure warning lights, an external exposure warning light must be used. Contact your dealer for help.
- Avoid taking exposures of pregnant women.

- Turn off all devices that generate electromagnetic waves, such as cellular or cordless phones and do not use remote controls, when taking an exposure.
- Do not take exposures of patients who are fitted with pacemakers.

Check list before using the unit

General

- Read and familiarize yourself with the Warnings and Precautions in the introduction.
- Make sure that you are fully acquainted with the relevant radiation protection measures.
- Make sure that all the required radiation protection equipment, such as radiation screens, are of the approved type and, where necessary, correctly installed.

The CCD receptor

- Make sure that the dental imaging software and the driver for the CCD receptor are installed in the PC connected to the x-ray unit.
- Make sure that the PC is switched on and the dental imaging software is running and ready to receive an image before using the x-ray unit.
- If the unit is connected to a PC that is a computer network, make sure that the network is operating and that all the identification and user rights for the network are correct.

Symbols that appear on the units

Exposure switch locked

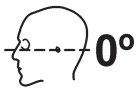
Exposure switch unlocked

On or enabled

Off or disabled

Protection light

Rotating unit return



Frankfort plane light

Radiation warning

Head supports open

Head supports closed

Test exposure

Positioning lights

Exposure switch

Panoramic exposure

Reduced width panoramic exposure

TMJ exposures (outer)

TMJ exposures (inner)

TMJ exposures

Partial exposure Patient´s left-hand side

Partial exposure Patient´s right-hand side

Frontal exposure

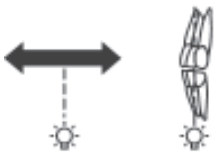
Height adjustment

Dangerous voltage

Alternating current

Protective earth (ground)

Earth (ground)



Focal trough positioning

Lock height adjustment

Unlocked height adjustment

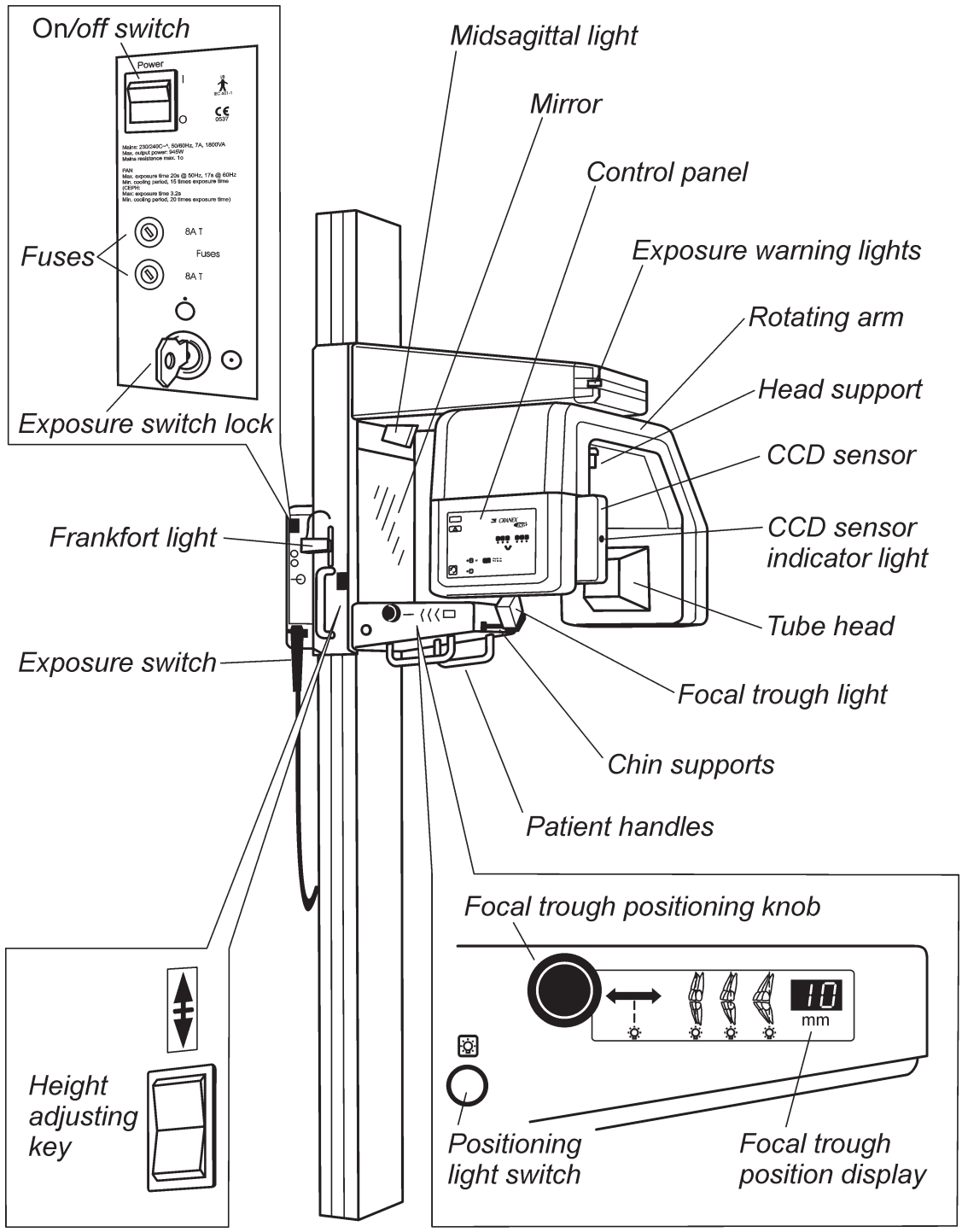
Type B equipment

CE (0537) symbol
MDD 93/42/EEC

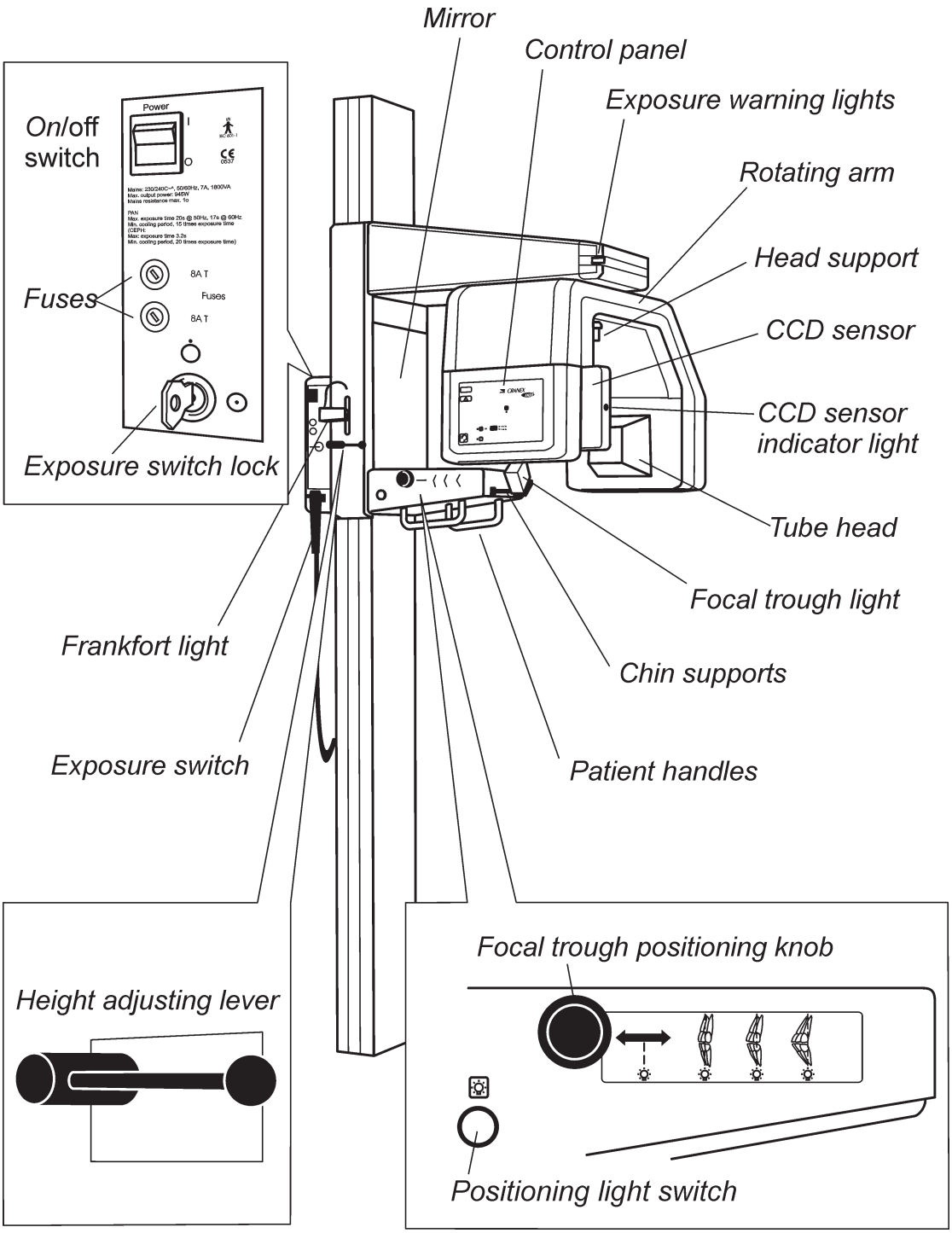
UL Classification

2. Unit description

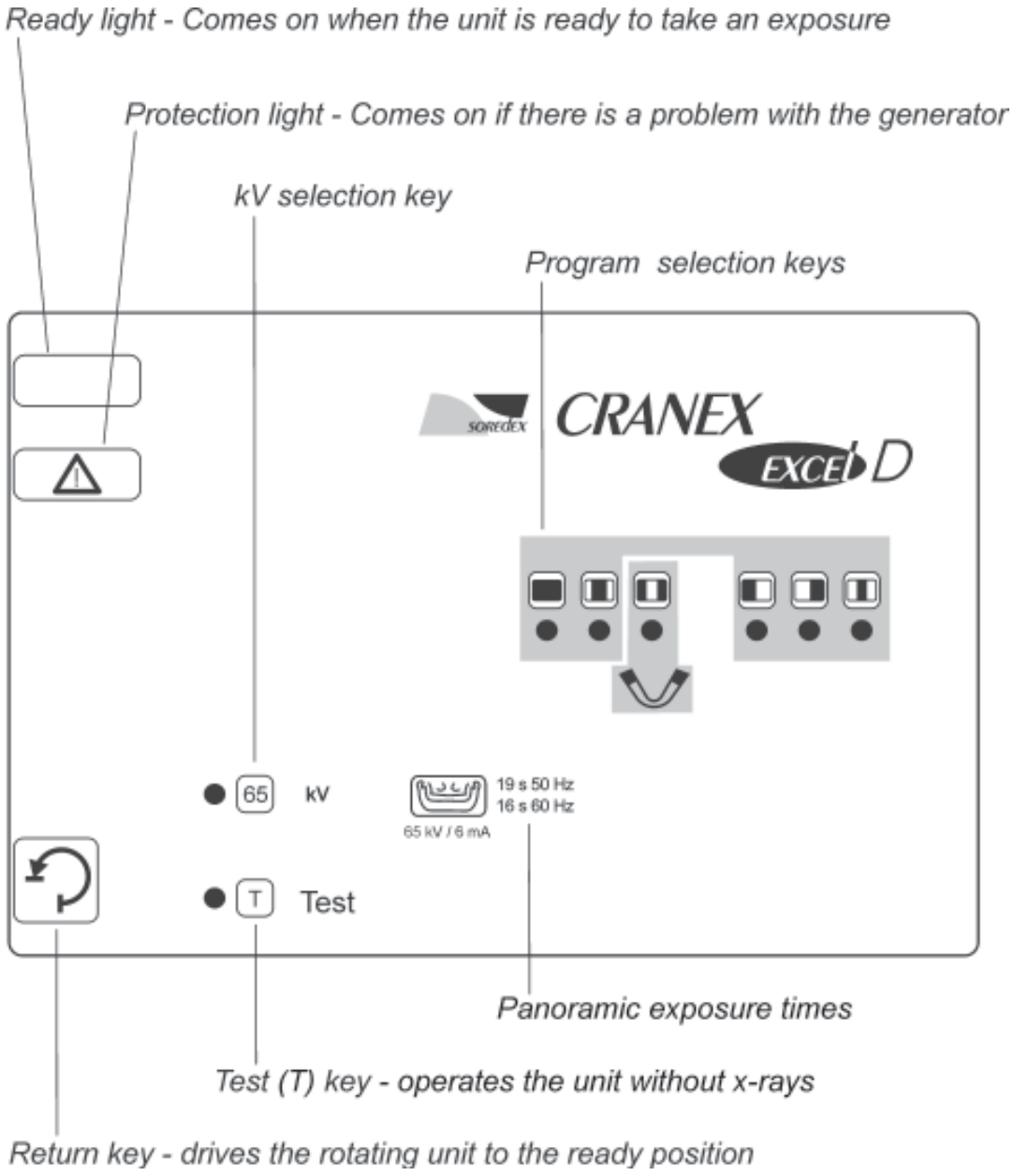
The Excel D



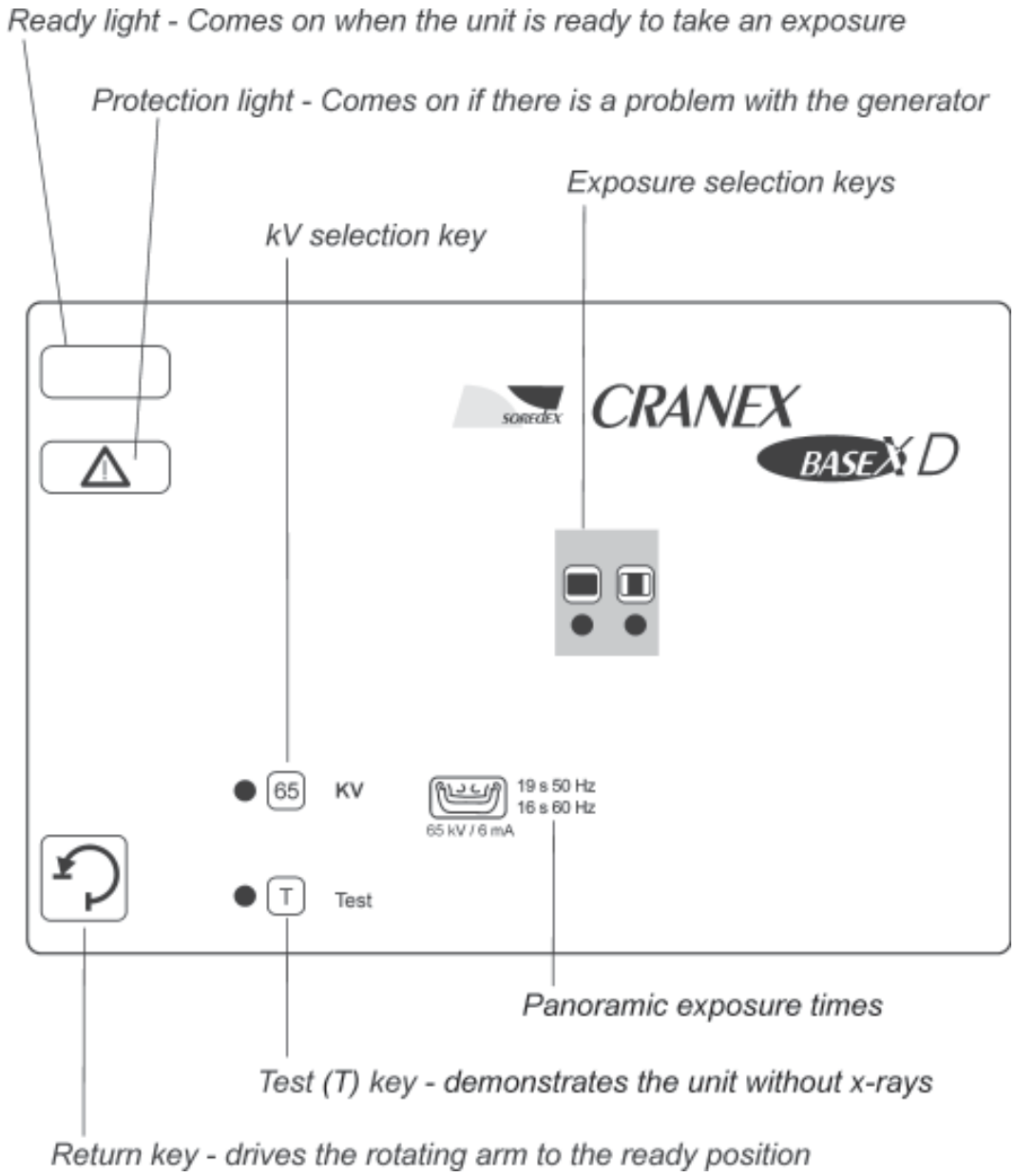
The BaseX D


Mirror
Control panel
Exposure warning lights
Rotating arm
Head support
CCD sensor
CCD sensor indicator light
Tube head
Focal trough light
Chin supports
Patient handles
On/off switch
Power
Fuses
8A T
Fuses
8A T
Exposure switch lock
Frankfort light
Exposure switch
Height adjusting lever
Focal trough positioning knob
Positioning light switch

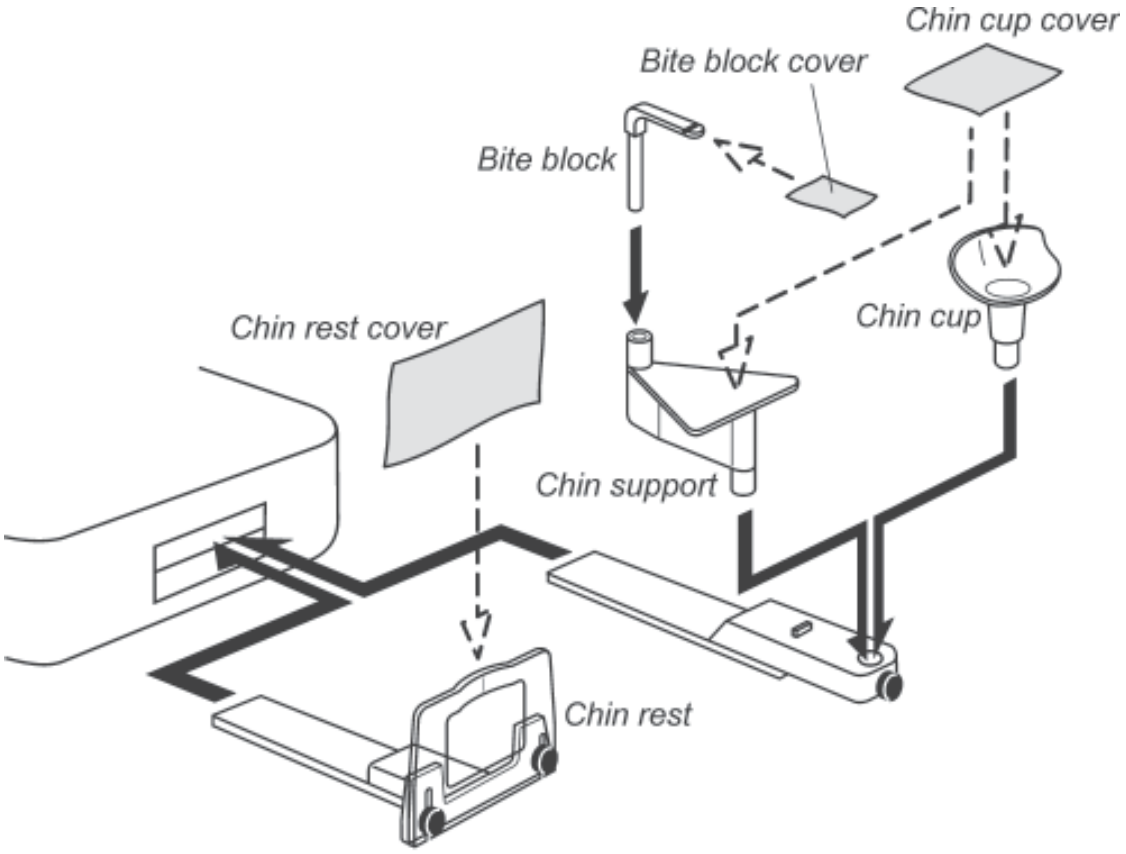
The Control panel - Excel D


Ready light - Comes on when the unit is ready to take an exposure
Protection light - Comes on if there is a problem with the generator
kV selection key
Program selection keys
CRANEX
EXCEED
65
kV
19 s 50 Hz
16 s 60 Hz
65 kV / 6 mA
T
Test
Panoramic exposure times
Test (T) key - operates the unit without x-rays
Return key - drives the rotating unit to the ready position

The Control panel - BaseX D


Ready light - Comes on when the unit is ready to take an exposure
Protection light - Comes on if there is a problem with the generator
Exposure selection keys
kV selection key
SOREDEX
CRANEX
BASE X D
65
KV
19 s 50 Hz
16 s 60 Hz
65 kV / 6 mA
T
Test
Panoramic exposure times
Test (T) key - demonstrates the unit without x-rays
Return key - drives the rotating arm to the ready position

Chin Supports



WARNING!
Always use the disposable covers with the chin supports

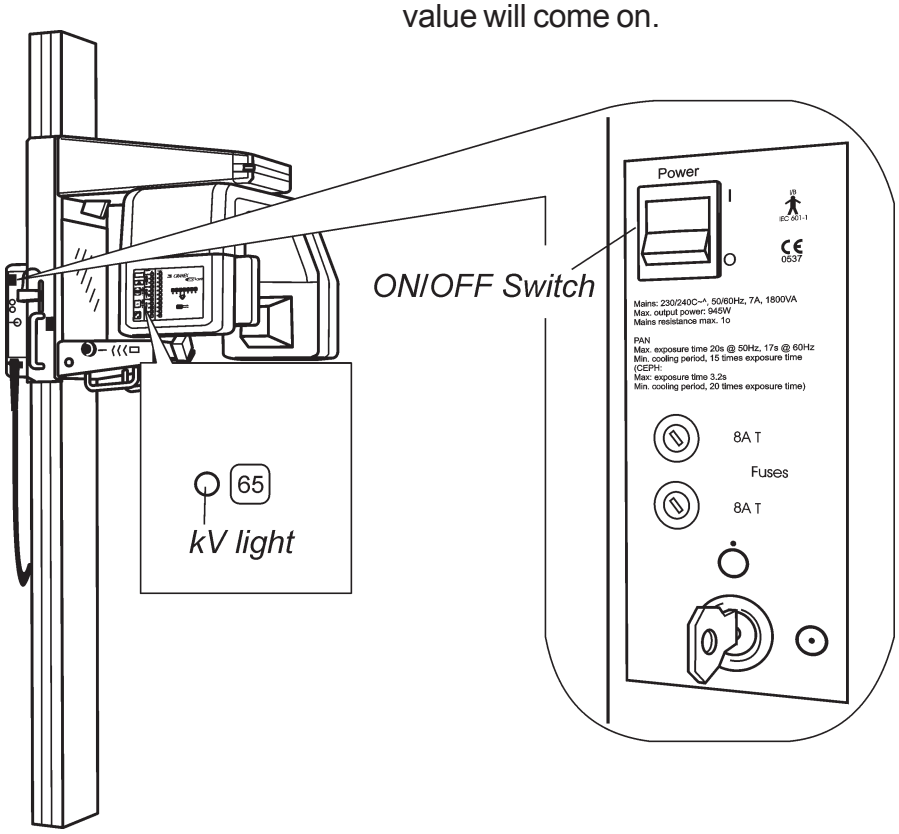
3. Using the Units

Switching the unit on and off

The on/off switch is located on the side of the unit.

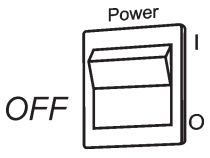
Switching the unit on

Press the on/off switch to the on position (I) to switch the unit on.
The on/off switch light and display light for the **kV** value will come on.



Switching the unit off

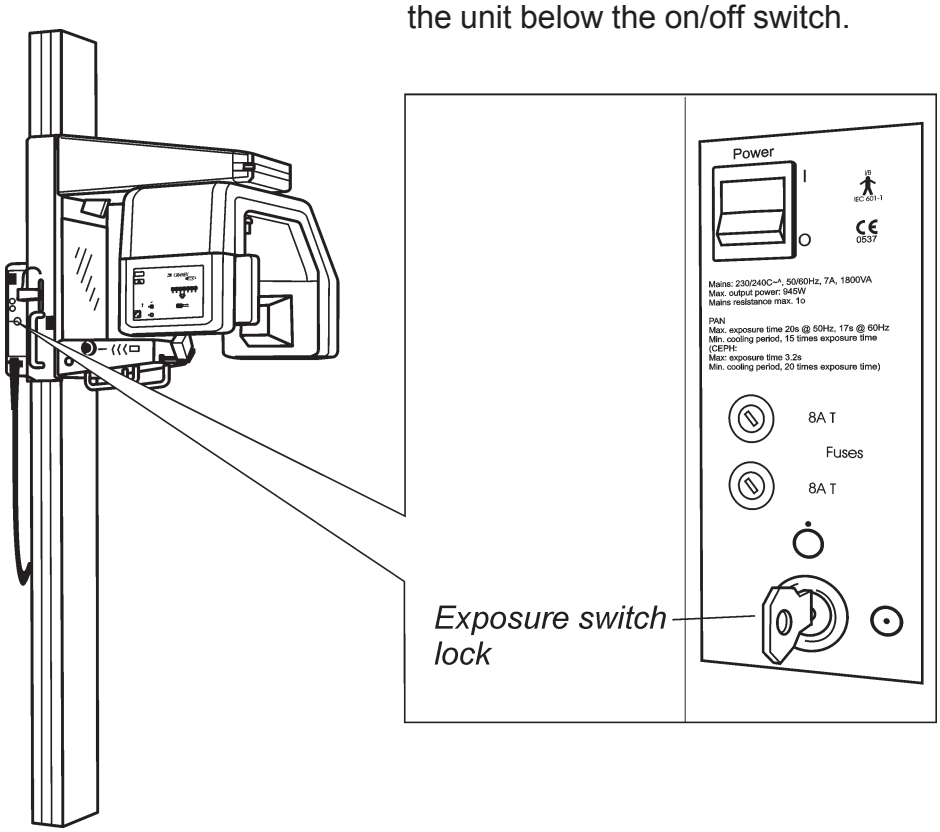
Press the on/off switch the off (0) position. All the lights will go out.



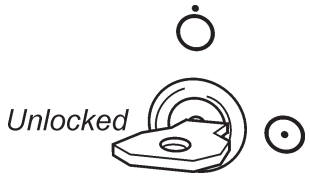
Switch the unit off at the end of every day or when it is not being used
It is also recommended that the exposure switch (see next page) is locked when the unit is not being used.

Exposure switch lock

The exposure switch lock allows the exposure switch to be locked. This prevents unauthorized people from taking exposures even if the unit is switched on. The exposure switch lock is located on the side of the unit below the on/off switch.

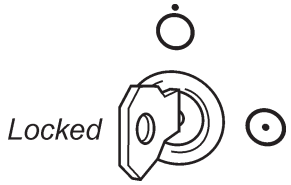


Unlocking the exposure switch



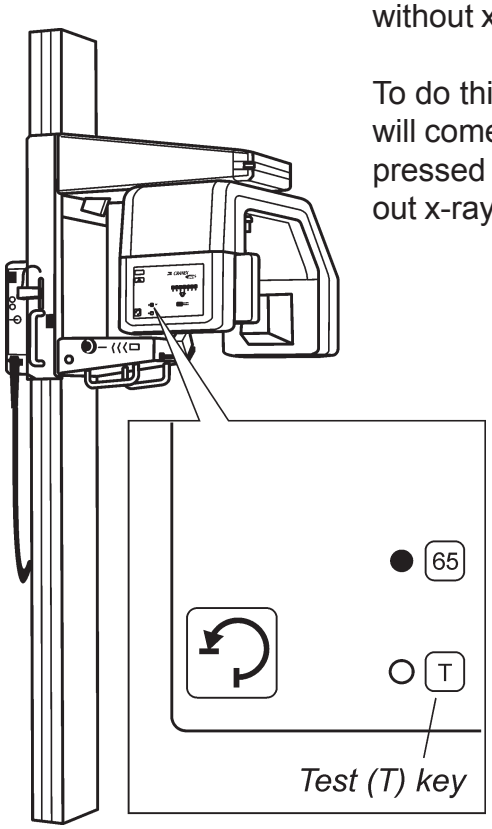
Insert the key into the exposure switch lock and turn the key clockwise to the horizontal unlocked position.

Locking the exposure switch



Turn the key anticlockwise to the vertical locked position and then remove the key.

Operating the unit without x-rays



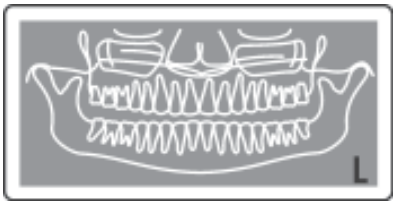
In some situations you may have to operate the unit without x-rays being generated.

To do this, press the test (T) key, the indicator light will come on. The exposure switch can now be pressed to demonstrate how the unit operates without x-rays being generated.

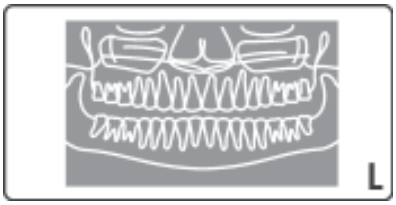
Taking Panoramic exposures

Panoramic exposure programs

The following images can be taken with the **Excel D** and **BaseX D**.



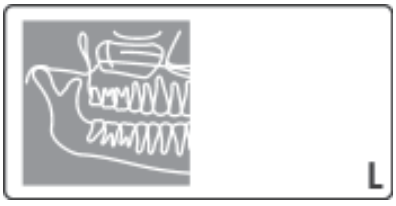
Full-width panorama.
Excel D and BaseX D
Magnification 1.3



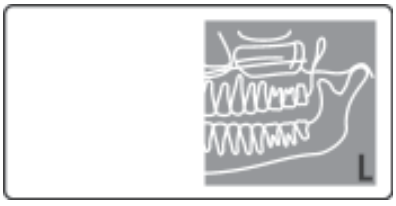
Reduced width panorama (-20%) pedo and sinus.
Excel D and BaseX D
Magnification 1.3

The following images can **only** be taken with the **Excel D**.

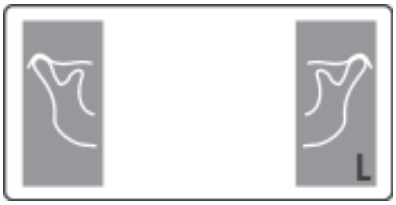
Frontal area of the mandible and maxilla.
Excel D only
Magnification 1.3



Right-hand side of the mandible and maxilla.
Excel D only
Magnification 1.3



Left-hand side of the mandible and maxilla.
Excel D only
Magnification 1.3

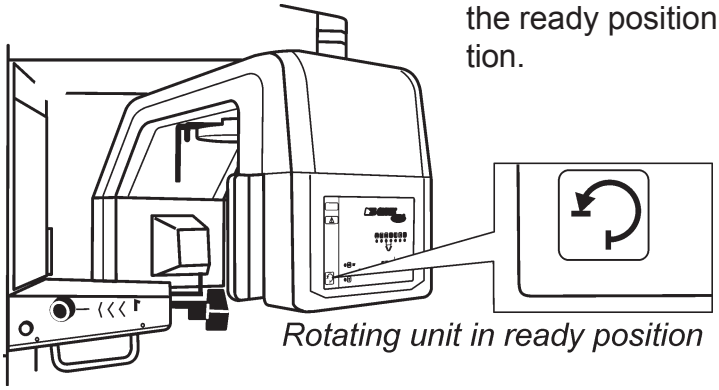


Temporomandibular joints (TMJ)
One image showing the left and right TMJs (mouth open or closed).
Excel D only
Magnification 1.3

Preparing the unit

1. Switch the unit on.
   (Also make sure that the PC is switched on, the dental imaging software is running and, where applicable, the network is operating.)

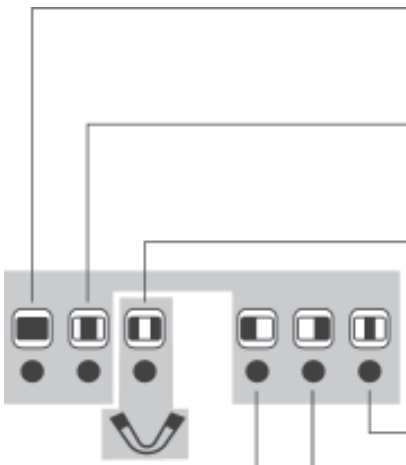
2. Press the Return key to drive the rotating unit to the ready position if it is not already in that position.



Rotating unit in ready position

3. Select the exposure program you require.

Excel D only
Press the appropriate program key. The program light will come on. The programs are as follows:



Normal panoramic or sinus exposure

Reduced width panorama (-20%) pedo or sinus exposure

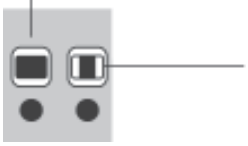
Temporomandibular joint (TMJ) exposure
One exposure showing both TMJs, either mouth open or closed. If TMJ images are required with the mouth open and closed, take two exposures.

Frontal (anterior) exposure

Partial exposure, right-hand side of patient

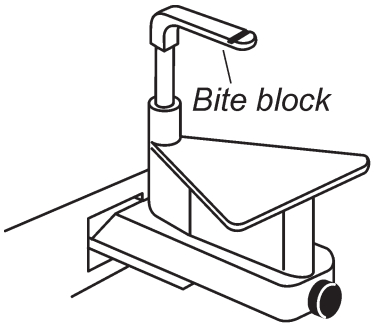
Partial exposure, left-hand side of patient

BaseX D only
The programs are as follows:



Adult for normal panoramic or sinus exposure

Child for Reduced width panorama (-20%) pedo or sinus exposure

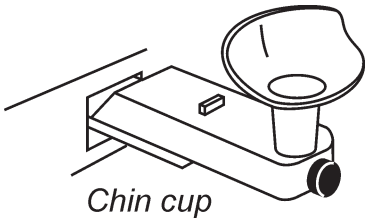


Chin support and bite block

4. Select the chin support for the exposure you wish to take.

For **panoramic** exposures,

use the chin support and bite block

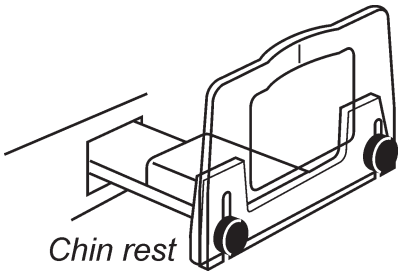


Chin cup

or if the patient is edentulous, the chin cup

or the chin rest if you cannot use either of the above with the patient.

For **sinus and TMJ** exposures, use the chin rest.



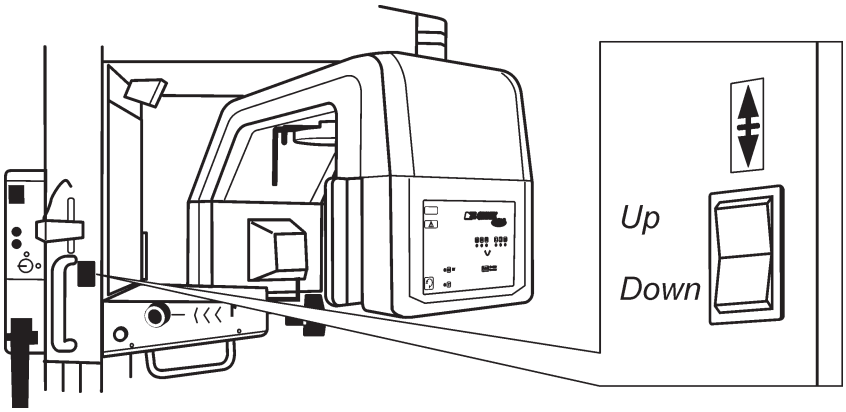
Chin rest

CAUTION: Always use the disposable covers with the chin supports.

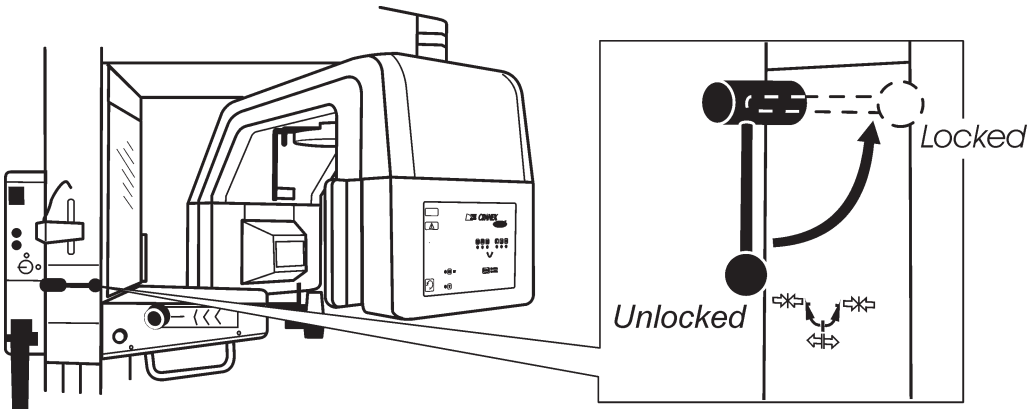
5. Ask the patient to remove any dentures, jewellery or spectacles and then place a lead apron over the patient's back.

6. Adjust the height of the chin rest so that it is level with the patient's chin.

Excel D
With the Excel D press, the height adjusting key to position the chin rest.

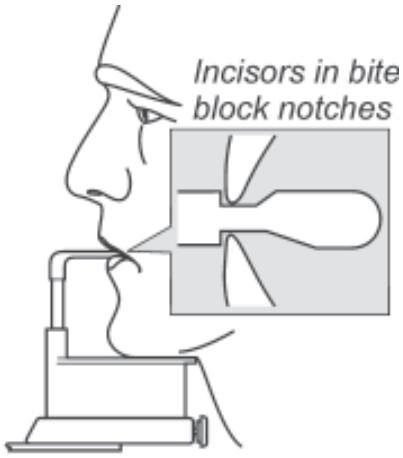


BaseX D
With the BaseX D, turn the locking lever downwards to unlock the chin rest. Adjust the position of the chin rest and then relock it by turning the locking lever back to the locked position.



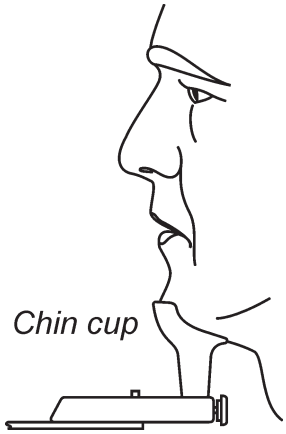
Positioning the patient for a panoramic exposure

1. Ask the patient to step into the unit and grasp the patient handles.

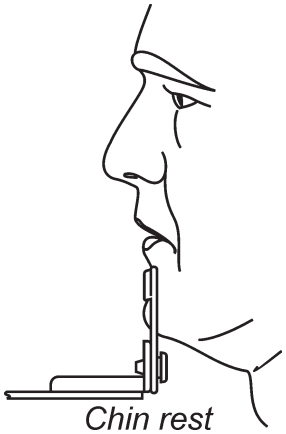


Chin rest and bite block

2. If you are using the chin rest and bite block ask the patient to place his chin on the chin support and bite the bite block. Make sure that the patient's upper and lower teeth are positioned in the respective notches on the top and bottom of the bite block.

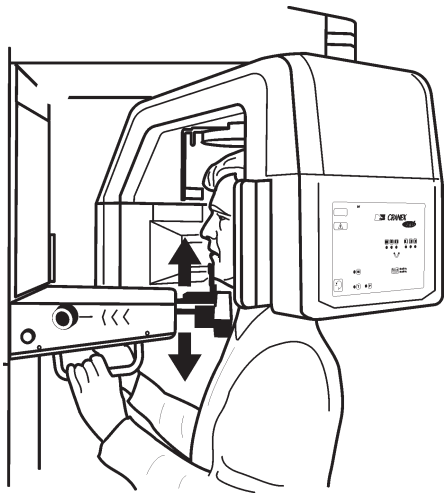


If you are using the chin cup ask the patient to position the upper and lower central incisors so that the biting edges are together.

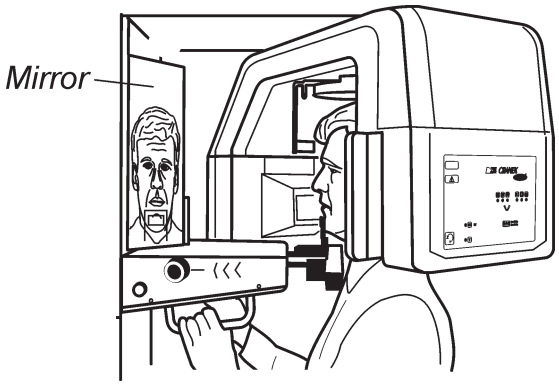


If you are using the chin rest ask the patient to position the upper and lower central incisors so that the biting edges are together and then press his lower lip against the chin rest.

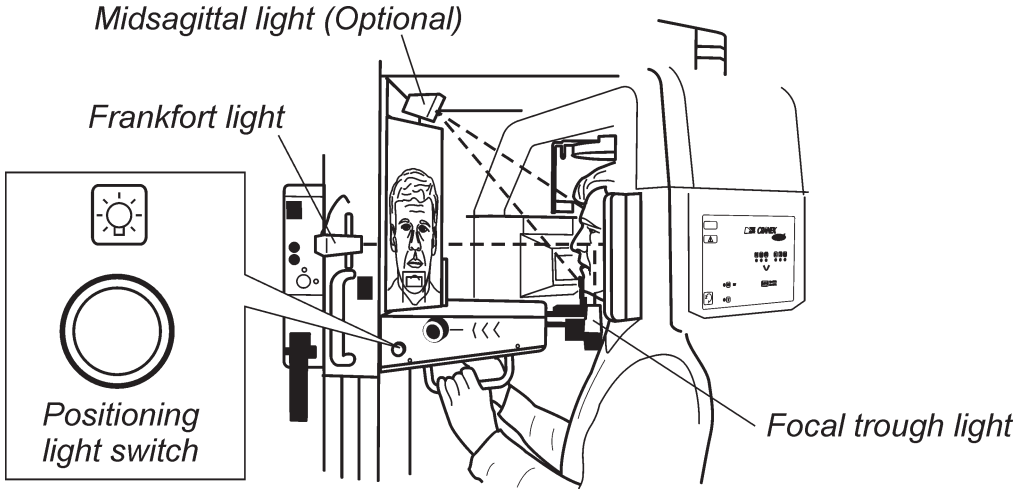
3. While the patient is holding the patient handles ask the patient to step forward a few centimetres so that patient is slightly off balance.
   This movement will encourage the patient to push their head forward in order to maintain balance.
   In this position the patient's cervical vertebrae will be stretched and straight and the patient will be in the best position for taking a panoramic exposure.
   If necessary adjust the height of the chin rest to “stretch” the patient.



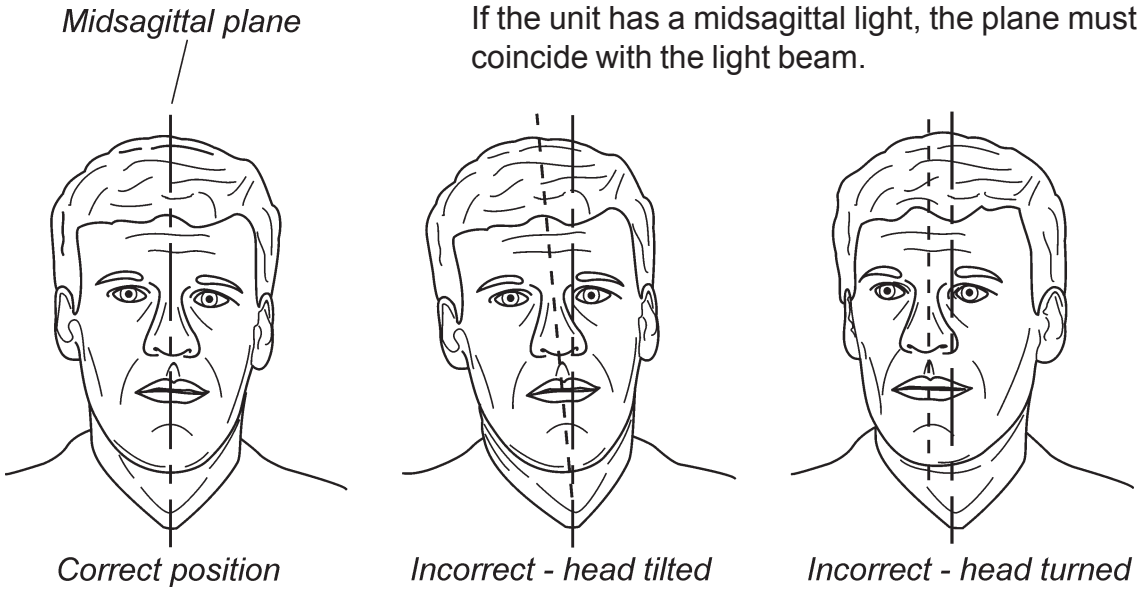
4. Open the mirror so that you can see a reflection of the patient in the mirror.



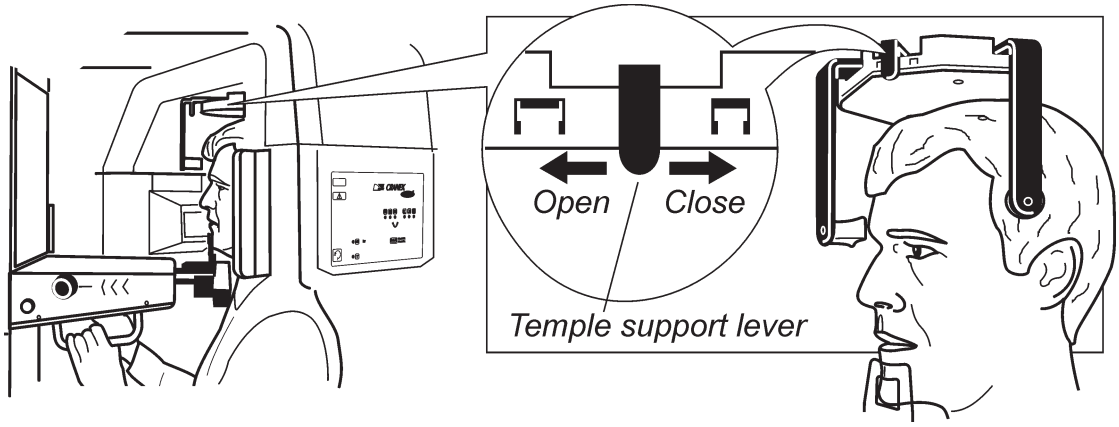
5. Press the positioning light button to switch the patient positioning lights on. The lights will remain on for 30 seconds. If you need more time, press the button again.



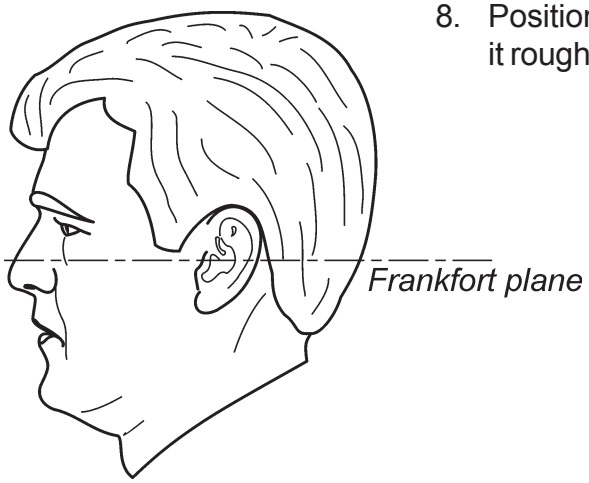
6. Look at the reflection of the patient in the mirror and position the **midsagittal plane** of the patient so that it is vertical. The patient's head must be positioned symmetrically and the patient must be looking straight ahead.
The patient's head is not tilted or turned to one side.
If the unit has a midsagittal light, the plane must coincide with the light beam.



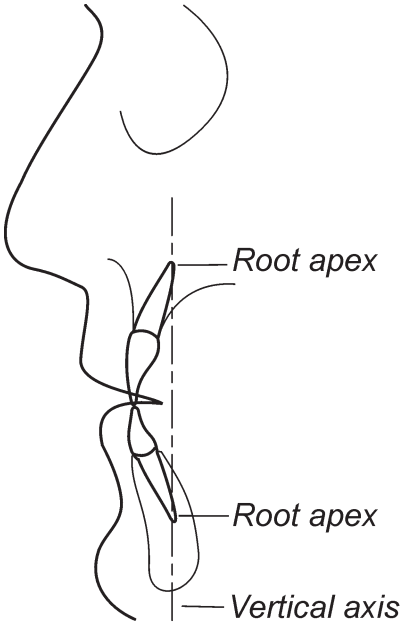
7. Close the temple supports by pushing the temple support lever to the right.

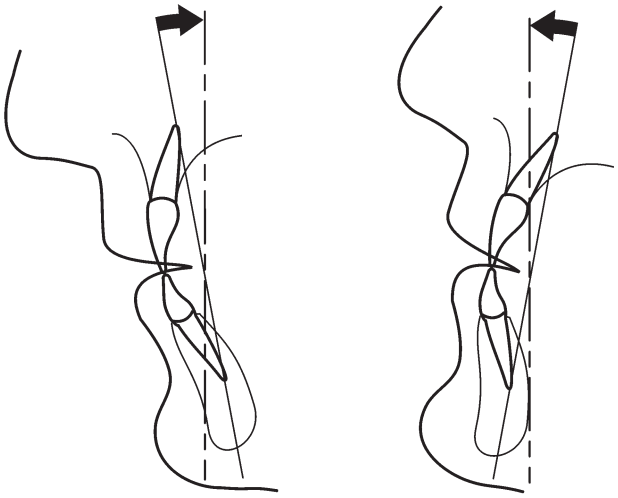


8. Position the Frankfort plane of the patient so that it roughly coincides with the Frankfort plane light.



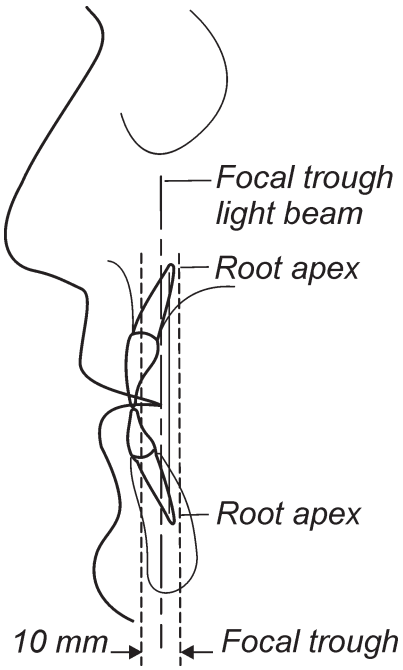
9. Ask the patient to open his lips so that you can see his teeth. Estimate the positions of the apices of the central upper and lower incisors.
Adjust the tilt of the patient's head, by raising or lowering the chin support, so that both root apices are on the same vertical axis.

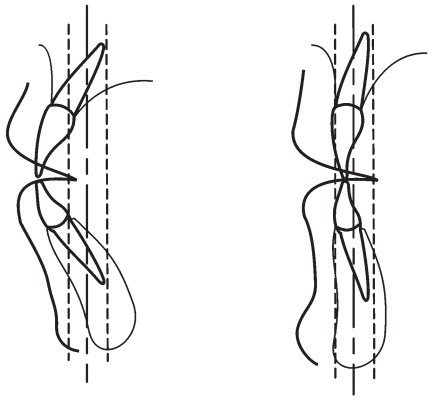




Tilt head to position root apices

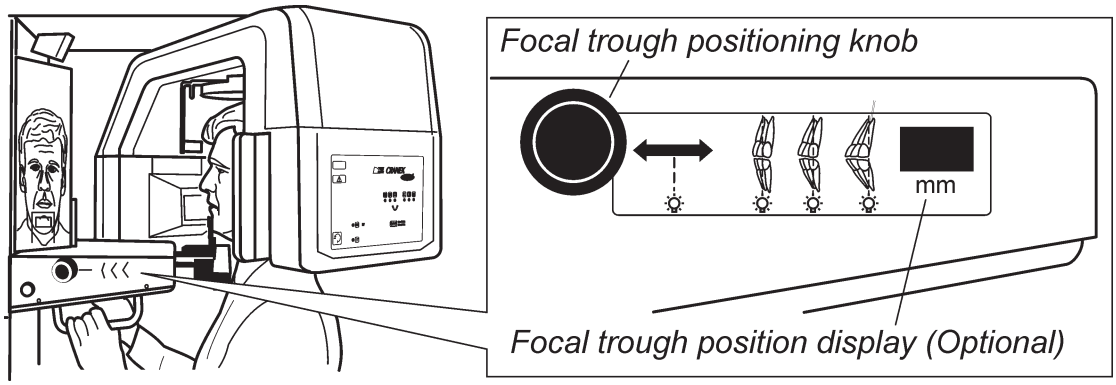
10. The focal trough light beam indicates the **center** of the focal trough, which is 10 mm wide at the front. The root apices of the central upper and lower front incisors must now be positioned so that they are within the focal trough.



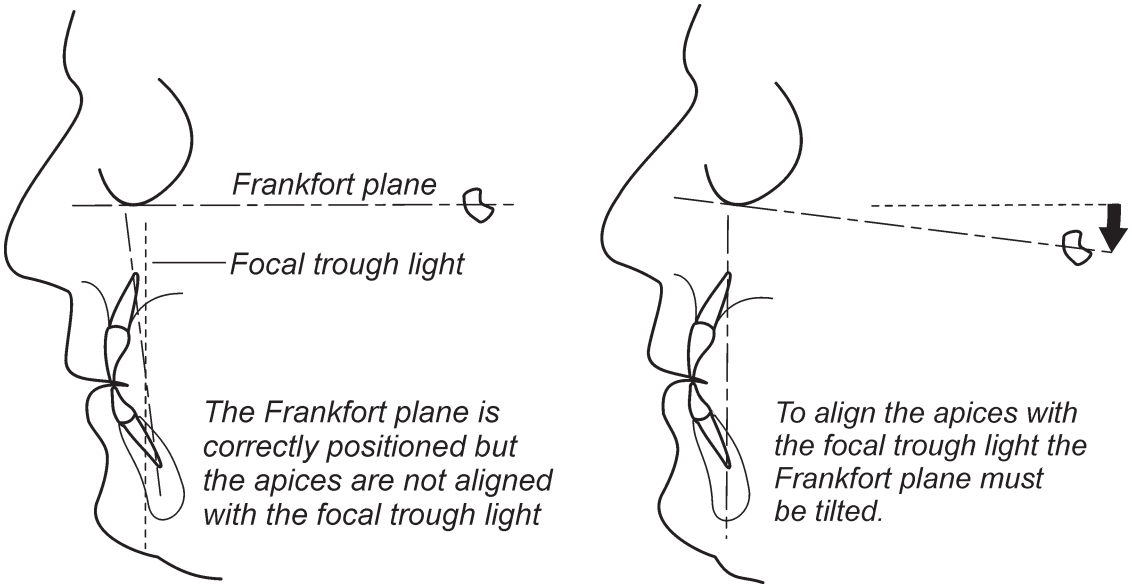


Different occlusion, different position

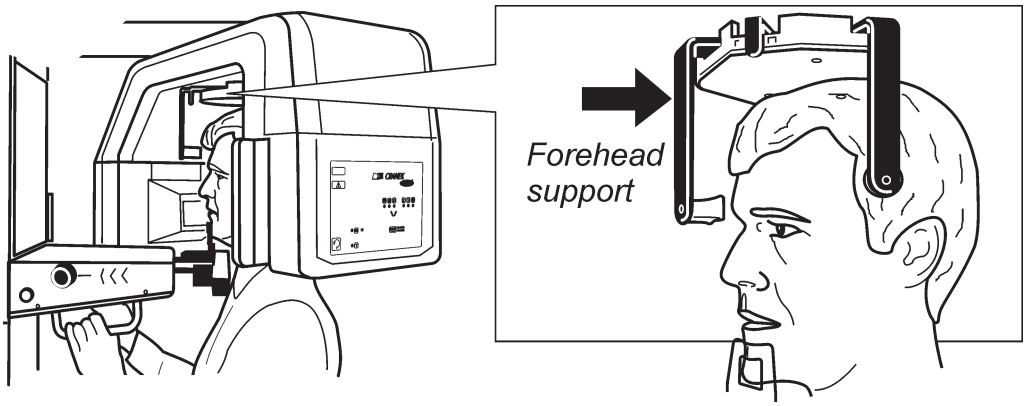
To do this, rotate the focal trough positioning knob backwards or forwards until the root apices of the central upper and lower front incisors are within the focal trough.
For patients with NORMAL occlusion the focal trough light beam will be positioned between the second and third teeth.



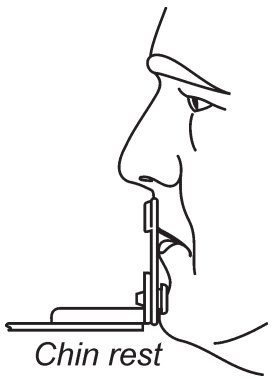
IMPORTANT NOTE
The most important factor in patient positioning is the position of the apices of the upper and lower central incisors. They MUST be positioned within the focal trough even if it means ignoring the position of the Frankfort plane.


Frankfort plane
Focal trough light
The Frankfort plane is correctly positioned but the apices are not aligned with the focal trough light
To align the apices with the focal trough light the Frankfort plane must be tilted.

11. Slide the forehead support towards the patient until it touches the patent's forehead.

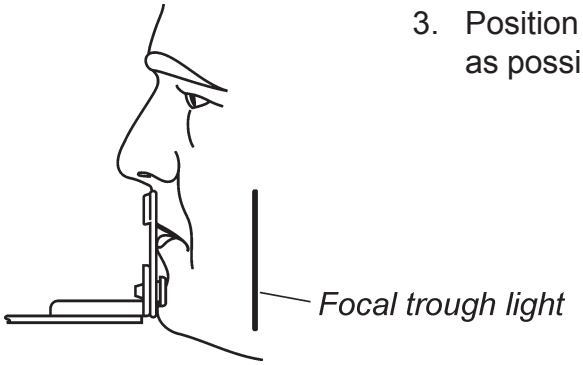


Positioning the patient for a Sinus exposure

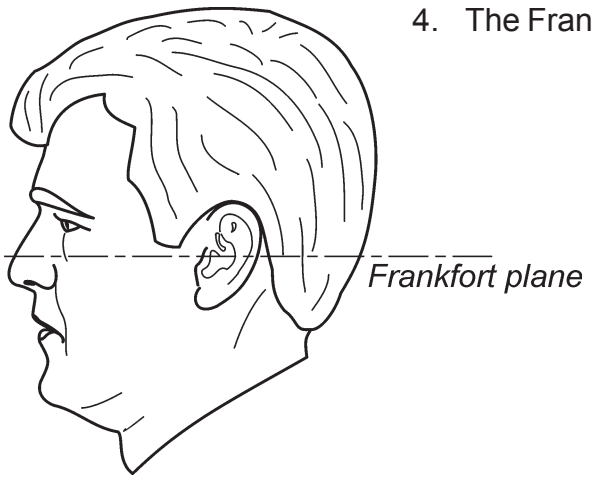


1. For sinus exposures use the chin rest.
   Ask the patient to press his upper lip against the chin rest.

2. The midsagittal plane is positioned the same as for a panoramic exposure.

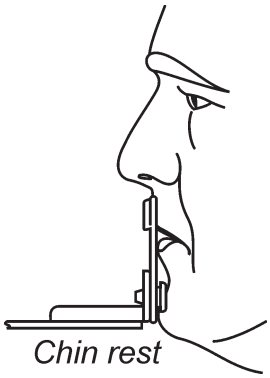


3. Position the focal trough light as far backwards as possible.



4. The Frankfort plane must be horizontal.

Positioning the patient for TMJ exposures (Excel D only)

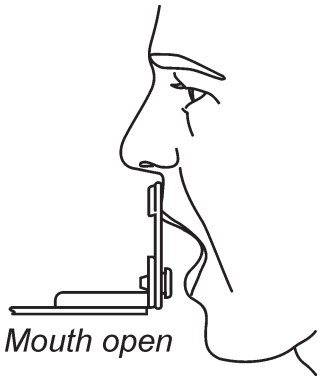


1. For TMJ exposures use the chin rest.
   Ask the patient to press his upper lip against the chin rest with his mouth closed.

2. The midsagittal plane is positioned the same as for a panoramic exposure.

3. The focal trough is positioned the same as for a panoramic exposure.

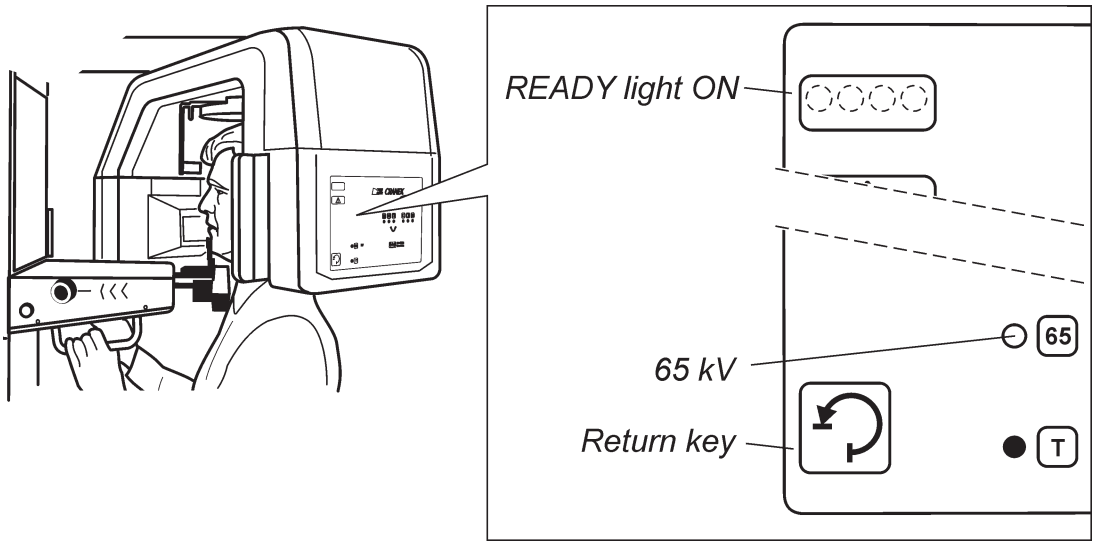
4. The Frankfort plane must be horizontal.



5. After taking the first pair of TMJ exposures the image data will be transferred to the PC. Ask the patient to open his mouth for the second pair of exposures.

Taking an exposure

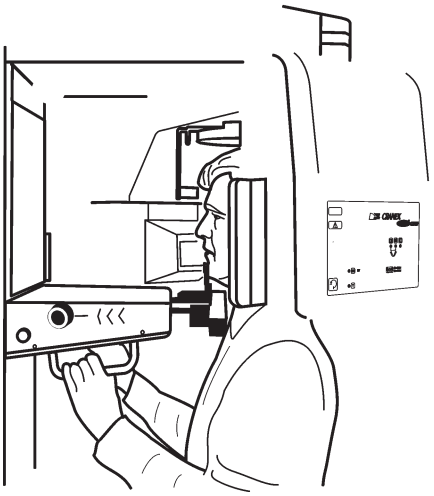
1. Press the RETURN key to drive the rotating unit to the start position.
   The 65 kV light will come on. This kV value can be used for ALL exposure programs

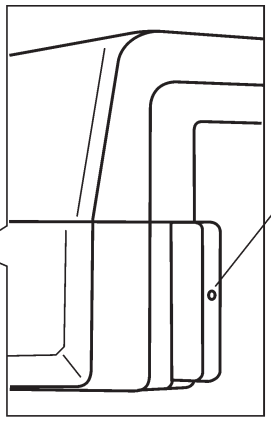


2. Ask the patient to breathe normally and not move until the exposure has been completed.
   Exposures last approximately 20 seconds.

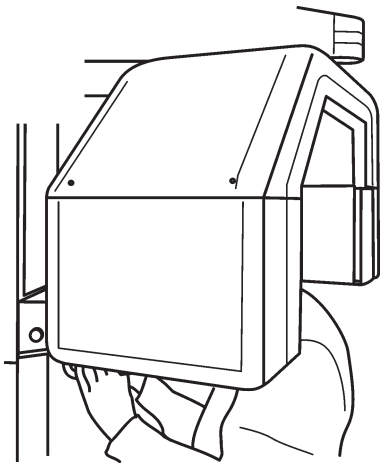
3. Move at least two metres away from the x-ray unit and protect yourself from radiation. Make sure that you are able to see and hear the patient during the exposure.

4. Press and hold down the exposure button.
The indicator light on the side of the CCD sensor will come on. First the light will be green, indicating start up. When the rotating unit starts to rotate, which indicates the start of the exposure, the light will change to yellow.
Hold down the exposure button for the duration of the exposure. During the exposure cycle you will hear an audible signal and the radiation warning lights will come on when radiation is generated.





Indicator Light:
- *green* = ready
- *yellow* = exposure
- *yellow flashing* = data transfer
- *red flashing* = data transfer problem



5 When the exposure is complete the rotating unit stops moving and the exposure warning lights go out. Remove your finger from the exposure button.
The yellow indicator light will start to flash. This indicates that data from the CCD sensor is being transferred to the PC. If the colour of the flashing light is red, it indicates that the data cannot be transferred. This could be because the imaging program in the PC is not open or the cable to the PC is not connected or is damaged. Contact your local service for help.

NOTE
TMJ Exposures (Excel D only)
To take the second pair of TMJ exposures:

Press the RETURN key after you have taken the first pair of exposures to drive the rotating unit back to the ready position.

Make sure that the TMJ exposure program is still selected.

Reposition the patient for the second pair of TMJ exposures (Refer to the section “Positioning the patient for TMJ exposures”) and then take these exposures as described above.
NOTE
When taking TMJ exposures, the audible signal and the radiation warning lights will ONLY come on when radiation is generated.

After exposure

1. Slide the forehead support away from the patient.
2. Open the temple supports.
3. Guide the patient out of the x-ray unit.
4. The digital image will be transferred to the PC.

4. Care and Maintenance

Cleaning the unit

WARNING
Switch the unit off before cleaning it.

Painted surfaces

All painted surfaces can be wiped clean with a soft cloth dampened with a mild detergent.
NEVER use abrasive cleaning agents or polishes on this equipment.

Positioning mirror and light lenses

The positioning mirror and positioning light lenses are made of glass. Use a soft cloth dampened with a mild detergent. NEVER use abrasive cleaning agents or polishes.

Surfaces that the patient comes into contact with

All surfaces and parts that the patient touches or comes into contact with must be disinfected after each patient.

Monitoring the operation of the unit

If any of the unit's controls or functions fail to operate or do not operate in the way described in this manual, switch the unit off, wait 30 seconds and then switch the unit on again. If the unit still does not operate correctly contact your service technician for help.

If you hear the exposure warning tone but the exposure warning light does not come on when an exposure is taken, stop using the unit and contact your service technician for help.

If you do not hear the exposure warning tone when an exposure is taken, stop using the unit and contact your service technician for help.

Maintenance

Yearly

Once a year an authorized service technician must carry out a full inspection of the unit. During the inspection the following will be carried out:
– a kV/mA test
– a beam alignment test
– a ball/pin test
– a check to see that the safety ground is connected
– a check to see that the positioning lights operate
– a check to see that the tube head is not leaking
– a check to see that all covers and mechanical parts are correctly secured and have not come loose.
A full description of all the tests and checks is described in the Service Manual.

Troubleshooting

Problem

The protection light comes on and you are unable to take an exposure.

Cause

There is a problem with the generator.

Solution

Switch the unit off. After a few seconds switch it on again. If the light comes on again, contact your dealer for assistance.

Problem

The image does not appear on the PC screen.

Cause

There is a data transmission problem between the CCD sensor and the PC.

Solution

Take another exposure (without a patient) and check that the CCD sensor indicator light functions as follows. When the exposure button is pressed, the indicator light should be green during start-up, and then change to red during and after exposure (two minutes). If the indicator does not function as described, contact your dealer for assistance.

If the indicator light functions correctly check that all the cables are correctly connected.

If the cables are correctly connected make sure that the image handling software in the PC is running and, if applicable, that the network is operating and that your user rights are correct.

5. Technical specifications

Classification

Complies with IEC class I type B, IPX0
Complies with IEC 601-1, IEC 601-2-7 and EN 55011 standards
Group 1, class A
Complies with DHHS Radiation Performance Standard, 21CFR Subchapter J.

The unit must be installed in a protected clinical environment.

Description

Dental panoramic x-ray units with a high frequency switching mode x-ray generators.
The panoramic version takes panoramic exposures.

Generator

TUBE
OPX/105, DE 100/15 or equivalent
FOCAL SPOT
BaseX D: 0.5 mm IEC 336, Excel D: 0.4 mm IEC 336
TARGET ANGLE
5º
TARGET MATERIAL
Tungsten
OPERATING TUBE POTENTIAL
Panoramic 63 - 81 kV (±5 kV) at preselected settings for servicing,
65 kV fixed for clinical use
OPERATING TUBE CURRENT
6 mA and 10 mA (±1 mA) at preselector,
4.5 mA and 6 mA or 7.5 mA and 10 mA in compensation mode for servicing,
6 mA fixed for clinical use
MAXIMUM TUBE CURRENT
11 mA
MAXIMUM OUTPUT POWER
945 W nominal
FILTRATION
minimum filtration 2.5 mm Al
BEAM QUALITY
HVL over 2.5 mm Al at 81 kV
OUTER SHELL TEMPERATURE
+50ºC (122ºF) maximum
DUTY CYCLE
Panoramic: 1:15, 81 kV/10mA

Power requirements

INPUT VOLTAGE
175-250 VAC (±10%), 50/60 Hz, adjustable, single phase, grounded socket
MAXIMUM LINE CURRENT
7 A at 81 kV/10mA
MAXIMUM LINE RESISTANCE
1 ohm
MAXIMUM LINE FUSING
10 A slow (main fuse 8A slow in device)
LINE SAFETY SWITCH (when required)
Approved type, min. 10 A 250 VAC
EARTH LEAKAGE CIRCUIT BREAKER (when required)
Approved type, min. 16 A 250 VAC, breaker activation leakage current in accordance with local regulations.

Mechanical parameters

PANORAMIC
SID 520 mm (±10 mm)
Magnification factor 1.3
WEIGHT
Panoramic unit 150 kg (330 lb.)
DIMENSIONS
Panoramic unit (HxWxD) 2240 x 1200 x 970 mm (88" x 47" x 38")
VERTICAL HEIGHT OF CHIN REST
850-1700 mm (33"-67")

Digital image receptor

- CCD sensor	PDC
-Active sensor surface	147.5 x 6.1 mm
-Pixel size	0.096 mm
- File size	approximately 4.2 MB per full panoramic image
-Application software	Digora for Windows 2.1

Timer

PANORAMIC EXPOSURE TIMES:

	50 Hz	60 Hz
Normal	19 s (±15%)	16 s (±15%)
Child	17 s (±15%)	14 s (±15%)
Sides	11 s (±15%)	9 s (±15%)
Middle	10 s (±15%)	8 s (±15%)
TMJ	3.3 + 3.3 s (±15%)	2.8 + 2.8 s (±15%)
	Max 240 mAs	Max 202 mAs

BACK-UP TIME

23.5 s (±1.5s)

Leakage technique factors

PANORAMIC

81 kV, 2400 mAs/h (81 kV, 10 mA, duty cycle 1:15)
(One normal exposure per 4 minutes cool-down period)

Measurement bases

- The kV is measured by monitoring the current flowing through a 450 Mohm, 1% feedback resistor connected between the tube anode and ground.
- The mA is measured by monitoring current in the HT return line, which equals the tube current.
- Both parameters are measured using a Soredex kV/mA meter (pt. no. 4800177) or with a digital multimeter (DMM) according to a specified procedure. The exposure time is measured using a radiation probe positioned in the primary beam.

Operating Room Temperature

15ºC (59ºF) to 32ºC (90ºF)

Storage/Transportation

+0 to +50, 0 to 85 RH%, 500 to 1080 mbar

Operating Relative Humidity Maximum

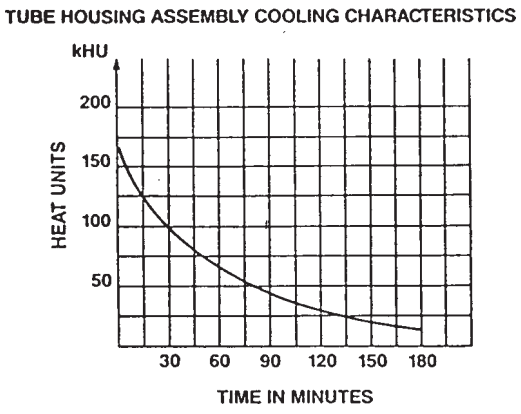
95%

Minimum computer requirements

The values in (brackets) are recommended values

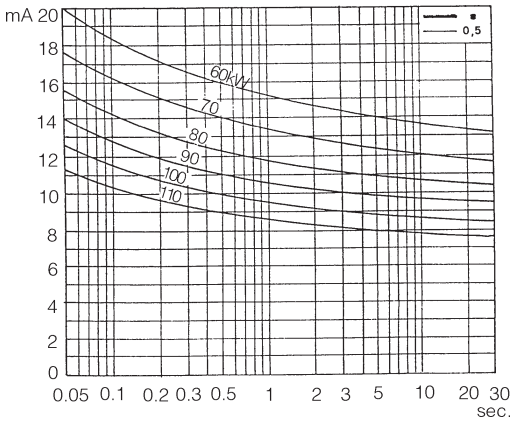
Operating system	Windows NT 4.0, 2000 or XP (Service Packs: NT 4/SP 4, 2000/SP 2, XP/SP 1)
CPU	Pentium III
RAM	256 MB
HDD	20 GB
Video RAM	16 MB
Network	100 Base-TX x2 (10/100 Mbit/s Base T x2)
Display	17" CRT or 14" TFT LCD true colour (19" CRT or 17" TFT LCD true colour)
CD-ROM driver Storage	SCSI tape drive (MO disk)

Tube housing assembly cooling characteristics

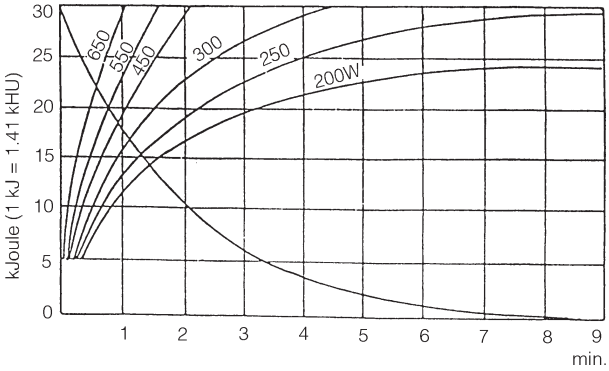


Tube rating chart

OPX/105

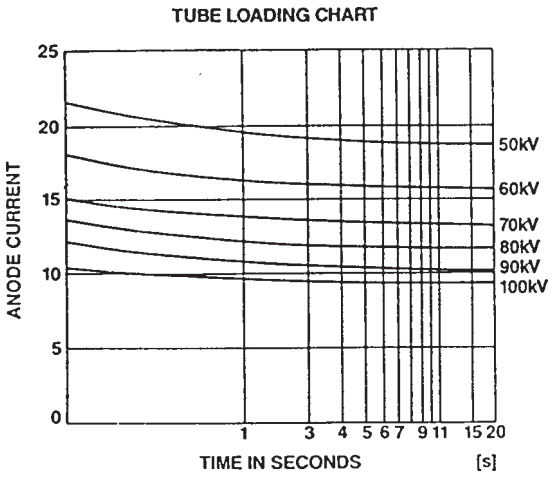


Anode thermal characteristics

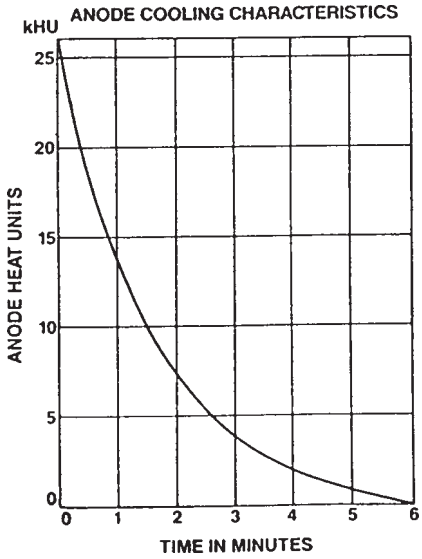


Tube rating chart

DE 100/15 ö

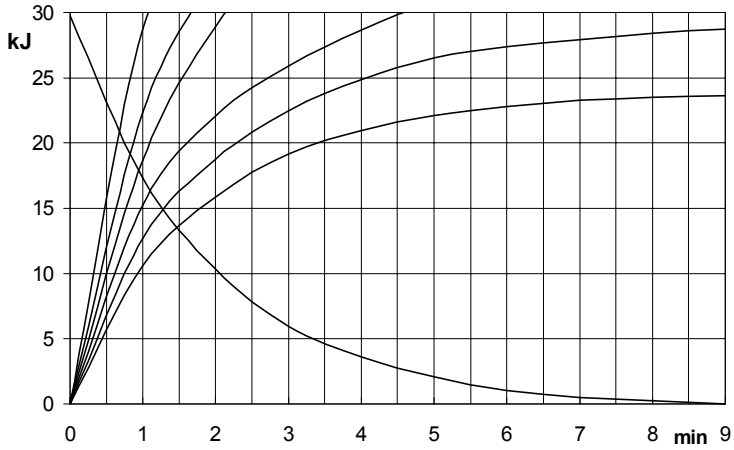


Anode thermal characteristics

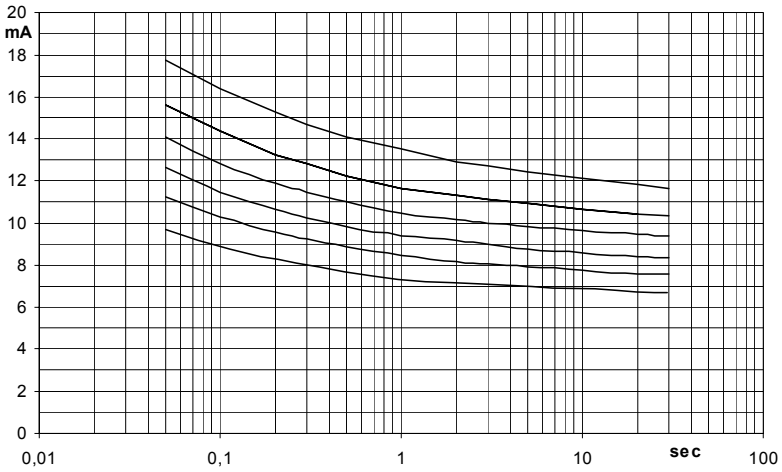


OPX/105-4

Thermal curves



Rating charts



Unit dimensions